

**BEST AVAILABLE COPY****REMARKS****Rejection of Claims and Traversal Thereof**

In the April 13, 2004 Office Action:

Claims 1-3, 8-12, 16 and 37 were rejected under 35 USC §112, second paragraph;

Claims 1-3, 11, 12, and 37 were rejected under 35 USC §102(b) as being anticipated by U. S. Patent No. 5,583,205 issued to Rees, Jr. (hereinafter Rees '205);

Claims 8-10 and 16 were rejected under 35 USC §103(a) as being unpatentable over U. S. Patent No. 5,583,205 issued to Rees, Jr. in view of U. S. Patent No. 6,159,855 issued to Vaartstra (hereinafter Vaartstra '855).

These rejections are hereby traversed in respect of the pending claims 1-3, 8, 10-12, 16 and 37, as amended herein. Reconsideration of the patentability of the pending claims is therefore requested in light of the following remarks.

**Rejection under 35 USC §112, second paragraph**

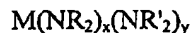
Claims 1-3, 8-12, 16 and 37 were rejected under 35 USC §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Applicants have amended independent claims 1 and 37 thereby obviating this rejection and respectfully request the withdrawal of same.

**Rejection under 35 USC §102(b)**

Claims 1-3, 11, 12, and 37 were rejected under 35 USC §102(b) as being anticipated by Rees '205. Applicants submit that Rees '205 does not anticipate applicants' claimed invention.

Applicants' claim 1 reads as follows:

1. A CVD precursor composition for forming a thin film dielectric on a substrate, such precursor composition including at least one metalloamide source reagent compound having a formula:

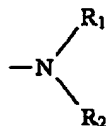


wherein M is selected from the group consisting of: Y, La, and Ta; N is nitrogen, each of R and R' is independently selected from the group consisting of H, aryl, perfluoroaryl, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>1</sub>-C<sub>8</sub> perfluoroalkyl, and alkylsilyl; (NR<sub>2</sub>)<sub>x</sub> and (NR'<sub>2</sub>)<sub>y</sub> are different amino ligands and R' is different from R; x is from 1 to 5; y is from 1 to 5; and x+y is equal to the oxidation state of metal M.

To anticipate a claim the prior art reference must disclose each and every element of the claimed invention as **arranged as in the claim** (See *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 221 USPQ 481, 485 (Fed. Cir. 1984)). Further, it is well settled in the law that a generic formula, which encompasses a vast number of compounds, **does not describe** nor anticipate all compounds embraced therein merely because they are within the scope of the formula (*In re Petering et al.*, 133 USPQ 275 (CCPA 1962)).

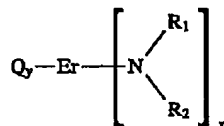
The Rees '205 reference describes three generic formulas, wherein each one may include hundreds of different possibilities. For example, the general formulas include:

(1)



at least on amide ligand wherein R<sub>1</sub> and R<sub>2</sub> are independently alkyl, alkenyl, aryl or di- or trialkyl-substituted silyl, or together with the nitrogen atom to which they are attached comprise a heterocyclic ring:

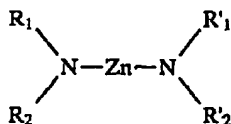
(2)



wherein R<sub>1</sub> and R<sub>2</sub> are independently alkyl, alkenyl, aryl or di- or trialkyl-substituted silyl, or together with the nitrogen atom to which they are attached comprise a heterocyclic ring, Q is a

monodentate or oligodentate ligand other than an amide ligand,  $x$  is an integer  $\geq 1$ , and  $y$  is an integer  $\geq 0$ , such that the F-series metal is substantially inert to further ligation; and

(3)



wherein  $R_1$ ,  $R_2$ ,  $R'_1$  and  $R'_2$  are independently alkyl, alkenyl, aryl, or di- or trialkyl-substituted silyl, or together with the nitrogen atom to which they are attached comprise a heterocyclic ring, provided that if  $R_1$ ,  $R_2$ ,  $R'_1$  and  $R'_2$  are each trialkyl-substituted silyl, at least one of  $R_1$ ,  $R_2$ ,  $R'_1$  or  $R'_2$  have at least one alkyl group containing a  $\beta$  hydrogen.

Clearly each one of the general formulas encompasses a vast number of compounds due to the number of permutations of  $R_1$  and  $R_2$  in formulas (1) and (2) and  $R_1$ ,  $R_2$ ,  $R'_1$  and  $R'_2$  in formula (3) which are independently chosen from alkyl, alkenyl, aryl, or di- or trialkyl-substituted silyl, or together with the nitrogen atom to which they are attached comprise a heterocyclic ring.

However, there is no disclosure using an F-series metal, wherein  $(NR_2)_x$  and  $(NR'_2)_y$  are different amino ligands and  $R'$  is different from  $R$  and thus the disclosure by itself does not describe applicant's claimed invention within meaning of 35 U.S.C. 102(b). When the general molecular formula is so broad that it may include hundreds of different compounds, there can be no anticipation because the likelihood of arriving at the specific species would be the same as discovering the combination of a safe by an inspection of its dials (*Ex parte Garvey*, 41 USPQ 583 (POBA 1939); *Ex parte Starr*, 44 USPQ 545 (POBA 1938)). Moreover, the USPTO cannot determine anticipation by a hindsight selection of the selected species by applicant's disclosure of such species within a broad general formula (See *In re Ruschig et al.*, 145 USPQ 274 (CCPA 1965)).

The compounds recited in claim 1 and any claims depending therefrom are clearly not anticipated by the broad generic formulas set forth in the Rees '205 reference because there is no description, expressed or implied for applicants' specific compounds. Compounds covered under a broad generic formula are "not described in a printed publication as meant by section 102(b)" (See *In re Wiggins, et al.* 179 USPQ 421, (CCPA 1973)). To hold otherwise, lists of thousands of theoretically possible compounds could be generated and published which, assuming it would be

within the level of skill in the art to make them, would bar a patent to the actual discoverer of a named compound no matter how beneficial to mankind it might be. In view of the fact that the purpose sought to be effectuated by the patent law is the encouragement of innovation, such a result would be repugnant to the statute. (*Id. In re Wiggins, et al.*)

Further, it is well settled in the law that "to serve as an anticipating reference, the reference must enable that which it is asserted to anticipate." *Elan Pharmaceuticals, Inc. v. Mayo Found. for Med. Educ. and Res.*, 68 U.S.P.Q.2d 1373, 1375 (Fed. Cir. 2003). See, *Amgen, Inc. v. Hoechst Marion Roussel, Inc.*, 65 U.S.P.Q.2d 1385, 1416 (Fed. Cir. 2003) ("[a] claimed invention cannot be anticipated by a prior art reference if the allegedly anticipatory disclosures cited as prior art are not enabled.").

Thus, to be enabling, "the prior art reference must teach one of ordinary skill in the art to make or carry out the claimed invention without undue experimentation." *Minnesota Mining and Manufacturing Co. v. Chemque, Inc.*, 64 U.S.P.Q.2d 1270, 1278 (Fed. Cir. 2002). "The determination of what constitutes undue experimentation in a given case requires the application of a standard of reasonableness, having due regard for the nature of the invention and the state of the art." *In re Wands*, 8 U.S.P.Q.2d 1400, 1404 (Fed. Cir. 1988).

Turning to the present case, Rees '205 is not an enabling disclosure and as such, is not anticipatory of applicants' claimed invention. Clearly, one skilled in the art reading Rees '205 would have to perform an undue and unreasonable number of experiments in order to arrive at applicants' claimed invention, and as such, Rees '205 does not enable applicants' claimed composition. Applicants' claimed invention is a metalloamide that comprises two different amide ligands wherein one amide ligand is substituted with the same R group and the other amide ligand is substituted with same R' groups. Referring to the just the examples disclosed in Rees '205, it is clear that all the compounds describe the use of only one type of amide ligand. Regarding the different formulas there is no disclosure, teaching or suggestion to construct a compound that includes two different amide ligands, wherein one amide group comprises R groups that are different from the R' groups of the other amide ligand.

Applicants therefore respectfully request withdrawal of the §102(b) rejection of claims 1-3, 11, 12, and 37 based on Rees '205.

### Rejection under 35 USC §103(a)

Claims 8-10 and 16 were rejected under 35 USC §103(a) as being unpatentable over Rees '205 in view Vaartstra '855. Applicants respectfully traverse this rejection and submit that Rees '205 in combination with Vaartstra '855 does not render applicants' claimed invention *prima facie* obvious.

The Office recognize that Rees '205 does not teach or suggest the use of solvents for CVD precursor. To remedy the shortcoming of Rees '205, the Office introduces the teachings of Vaartstra '855. However, this proposed combination does not establish a *prima facie* case of obviousness.

Initially, it should be noted that Rees '205 has provided very specific instructions for producing a product that did not include mixing the product with a solvent before depositing on a substrate. Instead, Rees '205 teaches deposition of a reactant gas. For example, it is stated at column 9, lines 39-44 that:

"Whether used to deposit an epitaxial layer of an F-series metal or to prepare a doped semiconductor material, the MPCVD methods of the present invention comprise introducing a reactant gas which comprises an F-series metal amide or zinc amide into a heated reactor chamber of an epitaxial reactor system. Epitaxial reactor systems generally comprise vessels which both store the source compounds of the materials to be deposited and provide a contact zone between a carrier gas such as hydrogen or argon and the source compounds to produce the reactant gas. Depending on whether the source compound is liquid or solid at operating conditions, this vessel is a bubbler or a percolator, respectively.

A reactant gas is produced by flowing the carrier gas through transfer lines into a storage vessel and contacting the stored source compound with the carrier gas such that some of the source compound is transferred to the vapor phase either at or below the saturation point." (emphasis added)

Further, from a review of the Rees '205 reference, it is evident that the synthesized erbium amide products was used in the deposition process in a crystal form that was synthesized according to the method described at column 11, lines 28-35, set forth below for ease of reference:

"This powder contained the lithium amide as the principal volatile impurity. The white lithium amide was sublimed at  $5 \times 10^{-2}$  torr and 80 °C. to a cold finger (-78°C.). The sublimation was repeated until no more lithium amide sublimed to the

cold finger. The pink residue was then sublimed at  $1 \times 10^{-4}$  torr and 130-140 °C. yielding 5 g (20% yield based on  $\text{ErCl}_3$ ) of the erbium amide product in the form of a pink amorphous powder." (emphasis added)

This crystal form of the erbium amide was deposited (Example 3 in Rees '205) in a hydrogen atmosphere using argon as the carrier gas. The source material was stored in independent stainless steel bubblers. The reference is completely devoid of any mention of a solvent for dissolving the crystal form.

Preparation of a zinc amide compound included removal of any solvent to generate a solid material, as described at column 12, lines 38-43, and set forth below:

"After stirring overnight at ambient temperature, lithium chloride was separated by Schlenk filtration and the solvent was removed under reduced pressure. The residue was then distilled under vacuum yielding a colorless, viscous liquid at 63°C. and 0.1 Torr which solidifies at 11°.-12°C."

Clearly, the compounds synthesized in Rees '205 are in crystal form and this crystal form is used in the deposition process, because the purpose of the Rees '205 was to provide a cleaner deposition process exhibiting a more consistent vapor pressure and cleaner decomposition kinetics so that fewer contaminants are left behind (see column 2, lines 25, 33).

According to the Office one skilled in the art would disregard the teachings of Rees '205 relating to a crystal precursor form and instead decide that the solid precursor materials of Rees '205 should be dissolved in a solvent before deposition, such as described in Vaartstra '855, even though there is no teaching or suggestion to modify the Rees '205 reference.

Vaartstra '855 describes the use of at least two separate and distinct metalloamide compounds dissolved in a solvent for delivery to a reaction chamber. The compounds are dissolved in a solvent to provide for a mixture of the two different compounds. Importantly, it is also stated that the "formation of solvates between the metalloamide compound and the solvent is not necessarily undesirable." (see column 8, lines 34-36) Thus, there is the possibility of introducing even additional compounds that could cause contamination of the deposited surface, which is exactly what Rees'205 is attempting to avoid.

The Office has not identified any objective or specific teachings or suggestions in the cited references that would motivate one skilled in the art to combine the references. Thus, the Office

seems to be merely reinterpreting the prior art in light of applicants' disclosure, in order to reconstruct applicants' claimed invention, but without any instructional or motivating basis in the references themselves. Such approach is improper and legally insufficient to establish any *prima facie* case of obviousness.

Applicants submit that a person of ordinary skill in the art, who was looking to improve or modify the products of Rees' 205 would not go in a direction that could introduce additional contaminants that could be deposited during deposition, especially because Rees' 205 is attempting to avoid such contamination. However, according to the Office this is exactly what one skilled in the art would do. Although this seems counterproductive to applicants, the Office does not seem to find this direction to be such. Applicants submit that if the teachings of Rees' 205 and Vaartstra '855 are combined, then the products of Rees' 205 will be rendered unsatisfactory for its intended use or change the principle of operation. According to the court in *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984), if proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. Clearly, Rees' 205 avoids the use of additional material that would require vaporization and introduce contamination on the deposited surface.

The Office proposes that the two references can be combined to teach and suggest applicants' claimed invention. However, even if the two references were combinable (despite the absence of any proper basis for such combination), the resultant combination would still not provide an enabling disclosure that teaches or suggests every limitation required by applicants' claimed invention. Vaartstra '855 suffers from the same shortcoming as that of Rees' '205 in that a vast number of structures are encompassed under the broad generic formulas with no indication of a metalloamide that comprises two different amide ligand wherein one amide ligand is fully substituted with the same R group and the other amide ligand is fully substituted with the same R' group.

According to the reasoning of the Office, the Rees' 205 reference in combination with Vaartstra '855 provides motivation to produce the compounds recited in applicants' claimed invention even though the formula is not exemplified in either reference but instead merely encompassed in general formulas. However, conspicuously missing from the record is any substantive evidence that one of ordinary skill in the art would have been motivated to choose the presently claimed formula and/or compounds to arrive at applicants' claimed invention.

The Court in *In re Jones* 21 USPQ2d 1941, (Fed. Cir. 1992) addressed this issue and stated that the fact that a claimed compound may be encompassed by a disclosed generic formula does not by itself render that compound obvious. *Jones* involved an obviousness rejection of a claim to specific compounds wherein a prior art reference disclosed a genus, which encompassed some of the claimed compounds. However, the *Jones* Court found that the prior art reference encompassed a "potentially infinite genus" but did not disclose or suggest the claimed compounds. As such the rejection by the examiner for obviousness was reversed. This is the present situation and the broad generic formulas of Rees '205 and Vaartstra '855 do not render applicants' claimed compounds obvious because the presently exemplified formula is not disclosed or suggested in either reference.

In light of the above discussion and the fact that (1) there is no motivation, suggestion or teaching to combine the references; (2) each and every recited limitation of applicants' claimed invention are not disclosed or suggested in the cited references; and (3) even if the references were combinable the primary reference Rees '205 will not operate as intended, it is clear that the cited combination fails to establish a *prima facie* case of obviousness of applicants' claims as herein amended.

Accordingly, applicants respectfully submit that all pending claims are patentably distinguishable over the proposed combination of Rees '205 and Vaartstra '855. Withdrawal of this rejection is respectfully requested.

#### **Petition for Extension of Time/Fees Payable**

The applicants hereby petition for a two month extension of time, extending the deadline for responding to the April 13, 2004 Office Action from July 13, 2004 to September 13, 2004. The entry of this petition results in a petition fee of \$420.00. A credit card form check in the amount of \$1190.00 is submitted herewith in payment of the petition fee for a two-month extension (\$420.00) and Request for Continued Examination (\$770.00). The U.S. Patent and Trademark Office is hereby authorized to charge any additional amount necessary to the entry of this amendment, and to credit any excess payment, to Deposit Account No. 08-3284 of Intellectual Property/Technology Law.



**Conclusion**

The pending claims 1-3, 8, 10-12, 16 and 37, as now amended, meet all disclosure requirements and patentably distinguish over the cited prior art, and in view of the forgoing remarks, it is respectfully requested that all rejections be withdrawn thereby placing the application in condition for allowance. Notice of the same is earnestly solicited. In the event that any issues remain, Examiner Kielin is requested to contact the undersigned attorney at (919) 419-9350 to resolve same.

Respectfully submitted



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